Advanced Distributed Learning
Kick-Off Meeting
November 3-4, 1997

Technical Working Groups Notes

Overview

Each ADL attendee, who selected the technical track, had the opportunity to participate in each of four technical working groups. The working groups were focused on Metadata, Content and Management, Technology Infrastructure, and Profiles. In each working group, a facilitator provided overviews of the concept area, described the approach IMS was taking, and facilitated discussions.

The facilitators for each group were:

Metadata - Tom Rhodes (NIST), Tom Wason (UNC-CH), Tom Hill (@Learning)
Content and Management - Mike Pettit (KPMG/Blackboard)
External Services - Phil Dodds (RH Associates)
Profiles - Frank Farance (Farance, Inc.)

The chair of the Technical Working Groups was Steve Griffin (Technical Director - IMS)

The following notes are synthesized from the comments received by the technical working group facilitators in each of their 4 sessions.

Content and Management

This working group discussed the characteristics of learning objects and the environments in which learners interact with content.

Topics discussed included: What is a learning object? How do learning objects and management systems communicate? What infrastructure is available to support simulations? How is content sequenced?

What is a learning object? The groups engaged in active discussion about the level of minimum complexity or intent that was required to be considered a learning object. On one side of the spectrum arguments were made for an abstract definition with few requirements or differentiation of learning objects by type. Others thought that more formal definitions with a minimum requirement that the object must have an educational intent before it could be considered a learning object.

It was agreed that defining the interactions among learning content and with management systems was as important as defining the characteristics of a learning object.

How do learning objects and management systems communicate? Participants discussed the technical nature of a learning object and how it might communicate with other content objects and management systems. It was suggested that any object-based standard in the learning arena should use, where practical, the native interfaces provided by Microsoft and Javasoft, the owners of the two major object models, ActiveX and Javabeans, respectively. Examples included JNDI and ASDI (directory interfaces) for tracking group membership in virtual classes.

What infrastructure is available to support simulations? The groups discussed the various industry and DoD simulation/gaming infrastructures. There was interest expressed on behalf of the IMS in learning more about the DoD HLA.

How is content sequenced? The groups discussed how to sequence content when content can come from various developers. Hierarchical and generic scripting solutions were discussed. Additional information and scenarios are needed to help advance understanding of this topic.

Profile

Agenda:
- Problem Statement
- IMS Issues
- Development
- Standards
- PAPI (Personal and Performance Information)
- Interoperability
- Plan/Future
- Issues

Problem Statement
- Simply put: Storing information about students.
- What kind of information? Personal and performance.
- Performance information:
  - Used by learning technology applications for
  - advancing students in courses.
  - Past: Student history
  - Present: Current sessions in progress
  - Future: Learning objectives
- Personal information:
- Anything not performance info
- Why separate personal and performance information?
  - Some applications, especially distributed learning, only need to know performance info -- why should a remote institution need to know your personal info?
  - Some applications, e.g., human resources, only need to know your personal information, -- why should a telephone directory need to know your grades?

IMS Issues:
- Partnership of universities, companies, institutions.
- Developing technology, will release to public.
- Support for distributed learning.
- Student information (learner profiles) are critical interoperability feature for distributed learning because students need to get credit for their work.
- Support IMS-compliant systems, courseware.

Development:
- Considered:
  - Existing commercial systems
  - Existing institutions
  - Healthcare -- good/bad experience from electronic patient records

Standards:
- IEEE 1484 is home of learning technology standards http://www.manta.ieee.org/p1484
- Several working groups and study groups:
  - P1484.1: Architecture/Reference model

    - P1484.2: Learner model
    - P1484.4: Task model
    - P1484.6: Course Sequencing
    - P1484.7: Tool/Agent Communication
    - P1484.9: Task ontology
- PAPI (Personal and Performance Information) specification submitted jointly by IMS and Farance/Edutool to IEEE 1484.2
- PAPI is a base document for the learner model standards
- Other base documents are possible, this isn't only one
- Current PAPI specification is at: http://www.edutool.com/papi
- PAPI specification is one part of Edutool's learning technology architecture, see: http://www.edutool.com/architecture

The PAPI Specification
- Granularity is unspecified (can be large or small):
    - Can apply to (as large as) a semester grade
    - Can apply to (as small as) an individual exercise
- Decomposed into five areas:
- Functionality -- What it does
    - Store and transmit student profile information
    - Coding - How information is organized
    - Record oriented (fields, subfields, etc.)
    - Not object-oriented
    - Can always wrap object model around records
- Syntax Binding - How codings are mapped to syntax
- Several bindings
- No preference for single binding
- Conversion from one binding to another to be standardized
- Tools to be available to the public
- Bindings: HTML, SGML, C, Java, tab, comma
- Others being considered: IDL
- Encoding representation
- Support for character sets
- Very important for internationalization and distance learning
- ISO 646 (invariant 7-bit)
- ASCII
- ISO 8859-1 (Latin 8-bit)
- ISO 10646-1 16-bit (Unicode wide character)
- ISO 10646-1 32-bit (wide character -- all characters)
- ISO 10646-1 UTF8 (multibyte, variable length)

Interoperability:
- Very important
- Recognize back offices can't really change too much
- Mapping to/from back offices via PAPI records supports distance learning in incompatible (but IMS-complaint) systems

Plans/Future
- To be resolved: automated protocol mappings for

incompatible systems -- resolved over next 6 months
- Continue standards work with IEEE 1484
- Work with IMS test beds to address compatibility issues

Issues:
- Need self-defining fields
- Security
- User and institution extensions
- CORBA interface
- Teacher model
- Combined view of all student records across all databases
- Rights holder issues
- Sponsor definitions
- Investigate MARC (Z39.2)

Technology Infrastructure

- Infrastructure means different things to different people

- Some think it is software "stuff" (software services)
- Some think it is physical stuff (servers, wires, clients, routers, etc.)

- **Important Software Services**
- Commerce
- Back Office
- Library
- Database/Query
- Tools
- Collaboration

- **Other Infrastructure Issues**
- Security
- Configuration Management
- Configuration metadata
- Distributed Management Systems
- Simulations
- Quality of Service (e.g., RSVP/RTP)
- Multicast
- Synchronized collaboration
- Asset Management

Metadata

The facilitators discussed the work to date of the IMS project and other metadata-related standards, such as RDF, Dublin Core and the Warwick Framework. Metadata are fields and associated values that describe a physical or electronic item. IMS has defined an extensible collection of metadata for learning materials. The IMS is also developing, with the National Institute of Standards and Technology (NIST), a repository of metadata that will be a resource to the broad community of content developers, users, and service providers to facilitate the identification and reuse of common metadata. Common terms simplify the process of tagging and discovering learning resources via Internet-based tools. Common terms also enable the development of technologies that can enhance an online learning experience through automated and intelligent processes (i.e. smart agents, intelligent tutors).